

REMARKS

Claims 1-20 remain for consideration in this application with claims 1 and 13 being in independent format. Claims 1, 2, and 5 have been amended and claims 8-20 are newly added. In view of the claims as they now stand, together with the remarks hereunder, Applicants submit that the present claims are patentable over the art of record.

Claim 1 has been amended to recite that the desulfurized cracked-gasoline has “an average octane number as determined by $(RON+MON)/2$ of at least about 81.35.” Support for this amendment can be found in the specification at page 40, lines 5-15, page 42, lines 16-17, page 45, line 11, page 50, lines 16-19, page 52, line 2-5, and page 54, lines 11-16. In particular, the minimum octane number of 81.35 now recited in claim 1, is supported by the specification because, as explained on pages 40, 52, and 54 of the specification, the average octane number, as determined by $(RON+MON)/2$, of the desulfurized cracked-gasoline recited in the claims is substantially the same as the average octane number of the cracked-gasoline feed prior to desulfurization. The specification discloses on page 40 that the desulfurized cracked-gasoline has an average octane number reduction of *at most* 3.5 when compared to the average octane number of the starting feed. For example, if the cracked-gasoline feed had an average octane number of 86.35, the average octane number of the desulfurized cracked-gasoline composition would be reduced at most to 82.85 ($86.35 - 3.5$). The lowest average octane number for the feed is disclosed in the application at Example VII, which discloses an average octane number of $(79.9 + 89.8)/2 = 84.85$. Accordingly, the lowest supported desulfurized cracked-gasoline octane number is 81.35. See also Table 5 which provides various average changes in octane number for the desulfurized cracked-gasoline, which fall well within the recited limitation. Claim 1 has also been amended to recite that the desulfurized cracked-gasoline comprises “about 15 to about 40 percent aromatics.” Support for this amendment can be found in the specification at page 5, lines 11-12, page 35, lines 9-11, and page 50, line 16. Specifically, the aromatics content of the desulfurized cracked-gasoline is essentially the same as the aromatics content of the cracked-gasoline feed. Finally, support for the amendments to claims 2 and 5 can be found in the specification at page 5, lines 8-13, page 40, lines 6-19 and Table 5 on page

55.

In the Office Action, the Examiner rejects claims 1-7 under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 5,167,797 to Ou (hereinafter the Ou patent). In support of this rejection, the Examiner alleges that the Ou patent discloses “sulfur-free hydrocarbons including cracked gasoline, and the known removal of sulfur compounds including thiols and thiophenes. Sulfur-free gasoline would inherently include between zero and less than about 1 ppmw sulfur compounds such as thiols or tetrahydrothiophene.” Office Action page 2, ¶ 3. For at least the reasons detailed below, Applicants submit that claim 1 is neither anticipated by, nor obvious over the Ou patent.

The Ou patent fails to teach or suggest each and every limitation of claim 1. For example, there is no express or inherent teaching or suggestion of a “composition comprising desulfurized cracked-gasoline having an average octane number as determined by $(RON+MON)/2$ of at least about 81.35, wherein said desulfurized cracked-gasoline comprises about 15 to about 40 percent aromatics by weight based on the total weight of the desulfurized cracked-gasoline, and less than about 1 ppmw thiol compounds and less than about 1 ppmw tetrahydrothiophene compounds,” as recited in independent claim 1. Specifically, the Ou patent contains no teachings or suggestions of a desulfurized cracked-gasoline composition. Rather, to meet this limitation in the instant claims, the Examiner relies upon a portion of the Ou patent directed towards catalytic cracking for the manufacture of methyl tertiary butyl ether (MTBE). Col. 7, ll. 30-35. Office Action page 2, ¶ 3. However, Applicants submit that MTBE is a gasoline additive — a fuel oxygenate that increases octane rating — and would not be understood by a person of ordinary skill in the art as teaching or suggesting cracked-gasoline, as alleged by the Examiner.

Applicants also submit that a desulfurized cracked-gasoline composition with the recited sulfur and aromatics content and octane number is not expressly or inherently disclosed in the Ou patent. Inherency can only be established if the disclosed process of the Ou patent *necessarily* results in a desulfurized cracked-gasoline product having less than about 1 ppmw thiol compounds and less than about 1 ppmw tetrahydrothiophene

compounds. See M.P.E.P. § 2112. The fact that a certain result or characteristic *may* occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 U.S.P.Q.2d 1955, 1957 (Fed. Cir. 1993) (reversed rejection because inherency was based on what would result due to optimization of conditions, not what was necessarily present in the prior art).

There is nothing the in Ou patent to teach or suggest that the recited desulfurized cracked-gasoline product necessarily results from the disclosed process. Rather, inherent in the Ou patent's disclosure is the teaching that the various disclosed hydrocarbons are compositions *other than* cracked-gasoline. This is because in contrast to cracked-gasoline and similar products which typically contain higher levels of sulfur (and hence require desulfurization to meet Federally-mandated levels), the hydrocarbon compositions disclosed in the Ou patent contain very low *initial* sulfur contents of 1-25 ppmw even before the desulfurization process of Ou is applied. See for example, Col. 7, ll. 35-36 (feed containing approximately 1-4 ppmw of dimethyl sulfide); Col. 8, ll. 60-68 (feed containing 25 ppmw dimethyl sulfide); Col. 10, ll. 9-12 (feed stream containing 9 ppmw dimethyl sulfide). Accordingly, a person of ordinary skill in the art would not regard the hydrocarbon composition disclosed in the Ou patent as inherently teaching or suggesting the recited desulfurized cracked-gasoline.

In the Office Action, the Examiner rejects claims 1-7 under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 5,858,212 to Darcy (hereinafter the Darcy patent). According to the Examiner, the Darcy patent discloses "cracked hydrocarbon products, including gasoline, wherein the product is virtually sulfur free and sulfur-compounds are removed, which would inherently include between zero and less than about 1 ppmw thiols and thiophene," and therefore, anticipates or renders obvious independent claim 1. Office Action page 3, ¶ 3. For at least the reasons detailed below, Applicants submit that claim 1 is neither anticipated by, nor obvious in view of the Darcy patent.

The Darcy patent fails to teach or suggest each and every limitation of claim 1. For example, there is no express or inherent teaching or suggestion of a "composition comprising desulfurized cracked-gasoline having an average octane number as

determined by $(RON+MON)/2$ of at least about 81.35, wherein said desulfurized cracked-gasoline comprises about 15 to about 40 percent aromatics by weight based on the total weight of the desulfurized cracked-gasoline, and less than about 1 ppmw thiol compounds and less than about 1 ppmw tetrahydrothiophene compounds,” as recited in independent claim 1.

Instead, the Darcy patent is concerned with providing a hydrocarbon treatment process as a suitable alternative to traditional reforming. Col. 5, lines 36-39. Although the Darcy patent discloses that some cracking may occur during the disclosed reforming process, this cracking does not necessarily result in a “cracked-gasoline.” Rather, a person of ordinary skill in the art would understand the term “cracked-gasoline” to mean a gasoline processed under specific cracking conditions such as thermally cracked gasoline, visbreaker gasoline, coker gasoline and catalytically cracked-gasoline. See Application page 2, lines 6-11. Accordingly, a person of ordinary skill in the art would not understand the reformer hydrocarbon product disclosed in the Darcy patent to teach or suggest a desulfurized cracked-gasoline composition as recited in the claims. Moreover, despite the extensive hydrocarbon analyses given in the tables at Columns 9-17, the Darcy patent provides no information on specific octane numbers, and Applicants submit that the recited octane number would not be inherent in the hydrocarbon streams disclosed in the Darcy patent. Therefore, because the Darcy patent fails to teach or suggest each and every limitation claim 1, Applicants submit that claim 1 is patentable over this reference.

In the Office Action, the Examiner rejects claims 1-7 under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over U.S. Re. 27,857 to Helfrey et al. (hereinafter the Helfrey patent). In support of this rejection, the Examiner asserts that the Helfrey patent discloses “a cracked gasoline product wherein the product is substantially free of sulfur compounds, which would inherently include between zero and less than about 1ppmw thiols and thiophene compounds.” Office Action page 4, ¶ 2. For at least the reasons detailed below, Applicants submit that the Helfrey patent neither anticipates nor renders obvious the claims of the present application.

Applicants submit that the Helfrey patent fails to teach or suggest each and every limitation of the claims of the present application. For example, there is no teaching or suggestion of a “composition comprising desulfurized cracked-gasoline having an average octane number as determined by $(RON+MON)/2$ of at least about 81.35, wherein said desulfurized cracked-gasoline comprises about 15 to about 40 percent aromatics by weight based on the total weight of the desulfurized cracked-gasoline, and less than about 1 ppmw thiol compounds and less than about 1 ppmw tetrahydrothiophene compounds,” as recited in independent claim 1.

Rather, although using the phrase “substantially free of sulfur compounds,” the Helfrey patent expressly defines the term “sulfur-free” as feed containing about 7 ppmw sulfur compounds. See Example I, Col. 7, ll. 59-63; Example II, Col. 8, ll. 62-63. According to the Helfrey patent, this “sulfur-free” feed results in a product with 0.4–0.6 percent aromatics and an octane number of 51.5–54. The Helfrey patent discloses that by adding tetraethyl lead (TEL) to the product, the octane increases to 73.8–75. Col. 8, lines 1-10. However, even with the TEL additive, which has been banned, the alleged “sulfur free cracked-gasoline product” in the Helfrey patent still does not meet the octane limitation of independent claim 1. Therefore, the Helfrey patent cannot be said to expressly or inherently teach or suggest each and every limitation of the present claims.

Moreover, Applicants contend that the Examiner is using impermissible hindsight reconstruction to selectively pick portions of the Helfrey patent to arrive at the claimed invention. For example, the Examiner’s assertion that the Helfrey patent discloses at Col. 5, ll. 65-58 a cracked gasoline product that is “substantially free of sulfur compounds,” mischaracterizes the teachings of the art. Office Action page 4, ¶ 2. Specifically, the low sulfur “product,” relied upon by the Examiner to meet this limitation in the claims, is the second-stage feedstock, which, according to the Helfrey patent, “is primarily the unconverted oil from the first stage” and is used for *diesel* or *jet fuel* production. Col. 3, ll. 35-37. In contrast, the Helfrey patent discloses that the first stage feed used for *gasoline* production “normally contain[s] substantial quantities of sulfur.” Col. 3, ll. 30-31. Accordingly, because the Helfrey patent does not expressly or inherently teach or suggest each and every limitation of claim 1, it cannot be said that claim 1 is either

anticipated by or obvious in view of the Helfrey patent.

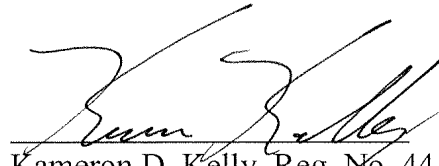
In view of the foregoing, Applicants respectfully submit that independent claim 1 is in condition for allowance. Additionally, while dependent claims 2-12 recite additional patentable features, these claims should also be in condition for allowance because they depend from patentable independent claims. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988). Applicants have added claims 13-20 to further define the invention and submit that these claims are also patentable over the art of record. Thus, Applicants submit that the present application should now be in condition for allowance and such allowance is courteously solicited.

Should the Examiner have any questions, please contact the undersigned at (800) 445-3460. The Commissioner is hereby authorized to charge any additional fees associated with this communication or credit any overpayment to Deposit Account No. 19-0522.

Respectfully submitted,

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